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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,870	12/26/2001	Joseph Smallcomb	7042-4	5200
7590 09/16/2005 Akerman, Senterfitt & Eidson, P.A. Post Office Box 3188 West Palm Beach, FL 33402-3188			EXAMINER YANG, LINA	
			ART UNIT 2665	PAPER NUMBER

DATE MAILED: 09/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/036,870

Applicant(s)

SMALLCOMB, JOSEPH

Examiner

Lina Yang

Art Unit

2665

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2001.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-13 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 26 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 12/26/2001.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "the discriminator in a feedback loop"; "a phasor"; must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 2, 6-7 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 2 recites "...determining the phase offset directly from the OFDM symbols using a discriminator in a feedback loop" in lines 1-3. However, there is no teaching of how the applicants provide this function. Since the specification does not teach how this function is done, the disclosure fails to enable a person skilled in the art to make and use the claimed inventions as recited in claim 2.

Claim 6 recites "detecting a negative phase in a OFDM modulated signal; narrowing a search window for the synchronization symbol; and adjust timing to an earlier arriving signal detected by a synchronization symbol recovery detector" in lines 3-6. However, there is no teaching of how to narrow the searching window and how to adjust timing to an earlier arriving signal detected by a synchronization symbol recovery

Art Unit: 2665

detector and what are the rationales. Since the specification does not teach how these functions are done, the disclosure fails to enable a person skilled in the art to make and use the claimed inventions as recited in claim.

Claim 7 recites "disabling a synchronization symbol recovery algorithm" in line 4. However, there is no teaching of how to disabling a synchronization symbol recovery algorithm. Since the specification does not teach how this function is done, the disclosure fails to enable a person skilled in the art to make and use the claimed inventions as recited in claim.

Claim 10 is rejected for the same reason set forth as in claim 2.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 2 and 10 are rejected under 35 U.S. C. 112, second paragraph.

Claim 2 recites the limitation "the phase offset " in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 is rejected for the same reason set forth as in claim 2.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 3-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugita et al. (U.S. Patent No. 5,608,764).

Regarding claim 1, Sugita teaches a method for timing recovery in an orthogonal frequency division multiplexing (OFDM) system, comprising the steps of:

detecting a lack of a synchronization symbol (34 in fig. 3);

determining a timing offset from calculating the Average Group delay over a set of OFDM symbols (fig. 3 and fig. 4; col. 5 lines 61-67 and col. 6 lines 1-19);

feeding back the timing offset to a demodulator (the combination of elements 23, 24, 26-30 in fig. 3) (fig. 3 and fig. 4 through AFC controller 46, carrier phase controller 46 and clock controller 50 to the "demodulator") ; and

adjusting the symbol timing based on the Average Group Delay fed back to the demodulator (col. 7 lines 9-21).

Regarding claim 3, Sugita further teaches the step of determining a phase offset comprises the step of using a phasor to estimate the average delay of a multi-carrier modulation symbol ("phase comparators" fig. 4, col. 5 lines 66-67 and col. 6 lines 1-19).

Regarding claim 4, Sugita further teaches the step of adjusting the symbol comprises the step of adjusting the symbol timing towards a target phase rotation (col. 6 lines 66-67 and col. 7 lines 1-8).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Sugita et al. (U.S. Patent No. 5,608,764).

Regarding claim 5, Sugita differs from the claimed invention in that Sugita does not specifically teach the step of maintaining symbol synchronization without ever detecting the synchronization symbol. However, Sugita teaches how to use the phase offset to maintain the OFDM synchronization ("phase comparators" fig. 4, col. 5 lines 66-67 and col. 6 lines 1-19; col. 6 lines 66-67 and col. 7 lines 1-8). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to understand that the detecting of the synchronization symbol is optional for maintaining symbol synchronization.

Art Unit: 2665

6. Claims 8-9 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Sugita et al. (U.S. Patent No. 5,608,764) in view of Uchiyama et al. (U. S. Patent No. 6,744,828 B1).

Regarding claim 8, Sugita teaches a digital receiver unit, comprising:

a receiver (fig. 3 or "tuner" in 21 in fig. 3, col. 4 line 19-21);

an orthogonal frequency division multiplexing demodulator (the combination of elements 23, 24, 26-30 in fig. 3);

detecting a lack of a synchronization symbol (34 in fig. 3);

determining a timing offset from calculating the Average Group delay over a set of OFDM symbols (fig. 3 and fig. 4; col. 5 lines 61-67 and col. 6 lines 1-19);

feeding back the timing offset to a demodulator (the combination of elements 23, 24, 26-30 in fig. 3) (fig. 3 and fig. 4 through AFC controller 46, carrier phase controller 46 and clock controller 50 to the "demodulator") ; and

adjusting the symbol timing based on the Average Group Delay fed back to the demodulator (col. 7 lines 9-21).

Sugita differs from the claimed invention in that Sugita does not specifically teach that a processor coupled to the receiver and the demodulator, wherein the processor is programmed to: detect a lack of a synchronization symbol; determine a phase offset from a set of OFDM symbols; feed back the phase offset to the demodulator; and adjust the symbol timing based on the phase offset fed back to the demodulator. However, it's well known in the art that a processor is used to implement the described functions. For

Art Unit: 2665

example, Uchiyama teach a digital signal processor is implemented in an OFDM receiving apparatus to perform the functions (col. 4 lines 54-63). Therefore, it would have been obvious for one of ordinary skill in the art at the time when the invention was made to include a processor coupled to the receiver and the demodulator as taught by Uchiyama in the assembly of Sugita in order to perform the timing recovery in OFDM receiving apparatus.

Regarding claim 9, the modified assembly of Sugita and Uchiyama further teaches that the digital receiver unit further comprises a phase detector coupled to the processor, wherein the phase detector detect the phase offset (Sugita; "phase comparators" fig. 4, col. 5 lines 66-67 and col. 6 lines 1-19).

Regarding claim 11, the modified assembly of Sugita and Uchiyama further teaches that the processor is further programmed to determine the phase offset using a phasor to estimate the average delay of a multi-carrier modulation symbol (Sugita; "phase comparators" fig. 4, col. 5 lines 66-67 and col. 6 lines 1-19).

Regarding claim 12, the modified assembly of Sugita and Uchiyama further teaches that the processor is further programmed to adjusting the symbol timing towards a target phase rotation (Sugita; col. 6 lines 66-67 and col. 7 lines 1-8).

Regarding claim 13, the modified assembly of Sugita and Uchiyama further teaches that the processor is further programmed to maintain symbol synchronization without ever detecting the synchronization symbol and only using the phase offset ("phase comparators" fig. 4, col. 5 lines 66-67 and col. 6 lines 1-19; col. 6 lines 66-67 and col. 7 lines 1-8).

Art Unit: 2665


**Conclusion**

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lina Yang whose telephone number is (571)272-3151. The examiner can normally be reached on 7:30am-6:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571)272-3155. The fax phone number for the organization where this application or proceeding is assigned is 517-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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